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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,378	03/12/2004	Ning Lu	A2004011	8880
26643	7590	08/06/2007	EXAMINER	
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ART UNIT		PAPER NUMBER		
		2621		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/800,378	LU, NING
	Examiner	Art Unit
	David N. Werner	2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-22 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-22 is/are rejected.
- 7) Claim(s) 5 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 12 March 2004 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20050809</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is the First Action on the Merits for US Patent Application 10/800,378.

Currently, claims 1-22 are pending.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "System and Method for Coding Images as Reference Images or Residue Images".

Claim Objections

3. Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 5 specifies that data is output in an MPEG format. However, claim 5 depends on claim 1, which already limits the invention to an MPEG-2 encoder.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

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5. Claims 16-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In a software-related claim, the word "containing" is not considered sufficient for linking a computer-readable medium with a computer program in statutory form. See MPEP §2106.01. It is suggested that the word "containing" in the first line in claim 16 be replaced with a concrete phrase such as "storing", "embodied with", "encoded with", "having stored", or "having encoded".

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,037,987 A (Sethuraman). Sethuraman teaches a system for choosing a macroblock-coding mode. Regarding claim 1, the system of Sethuraman may be applied to MPEG-1, MPEG-2, H.261, or H.263 coding (column 1: lines 20-21). In determining the encoding mode for a macroblock, first, it is received as a standard MPEG YCrCb uncompressed signal (column 3: lines 40-55). This corresponds with the step of "receiving input data containing image information". Once the encoding mode is set, for example, as a residual signal, it is transformed according to the DCT process (column 4: lines 26-39). This corresponds with the step of "generating encoded data based on a frequency domain transform".

Getting back to selecting an encoding mode, it is well known in the art that in the MPEG-2 standard that there are three types of frames: I-frames, P-frames, and B-frames. An I-frame cannot refer to another frame, and so if the current frame is an I-frame, there is inherently no encoded reference available. If the current frame is a P-frame, then it refers to the previous I-frame as a reference, and if the current frame is a B-frame, then it may refer to the I-frame or P-frames as encoded references. This is expected and inherent in an MPEG-2 encoder. Sethuraman encodes I-frames and P-frames as reference frames for future encoding (column 5: lines 44-47). This corresponds with the step of "determining whether an encoded reference is available for use". In an I-frame, every macroblock is intra-coded, that is, it does not depend on a reference macroblock. In a P-frame, a macroblock may be intra-coded, or forward predictive, that is, dependent on a macroblock in a previous frame as a reference. In a B-frame, a macroblock may be intra-coded, forward predictive, backward predictive, that is, dependent on a macroblock in a future frame as a reference, or bidirectionally predictive, that is, dependent on both a previous frame and a future frame as references. See, for example, Watkinson, MPEG-2, pp. 183-187 for details. Forward predictive, backward predictive, or bidirectionally predictive encoding modes are collectively known as inter-coding modes.

Before selecting an encoding for a macroblock in an inter-frame, that is, a P-frame, or a B-frame, Sethuraman performs a variety of test motion compensation calculations, and each prediction is subtracted from the current macroblock to form a residual signal (column 4: lines 16-25). This corresponds with the step of "generating

residue data". If the current frame is an I-frame, it is inherent in an MPEG encoder that there is no encoded reference frame available. The I-frame, however, may be used as a reference frame for future encoded inter-frames (column 5: lines 44-47). This corresponds with the step of "storing the encoded data as an encoded reference".

Regarding claim 2, in Sethuraman, method 200, illustrated in figure 2, selects an encoding mode for a macroblock as the best inter-coding mode, in which case residual data is encoded, or, when appropriate, the intra-coding mode (column 5: line 49–column 7, line 6). If the current frame is a P-frame, the current encoded data may be used as a reference for a neighboring B-frame. Regarding claim 3, Sethuraman chooses the encoding mode that produces the least amount of distortion. However, if two modes produce the same distortion amount, the mode that produces the least amount of coding bits is selected (column 6: lines 42-44). Regarding claim 4, once a block is DCT coded and quantized in accordance with the MPEG-2 standard, it is further encoded according to Variable-Length Coding (VLC) as the final output data stream (column 4: lines 55-65). Regarding claim 5, as mentioned previously, Sethuraman is an MPEG encoder (column 1: lines 20-61). Regarding claim 6, each block of a residual signal is processed by the forward Discrete Cosine Transform (DCT) to produce an 8 x 8 block of DCT coefficients (column 4: lines 32-35).

Regarding claim 7, as illustrated in figure 6, the encoder of Sethuraman may be a physical device 616 coupled to a processor 612 in a computer 610, or may be represented as software executed by the processor (column 9: lines 24-38). Then memory 614 corresponds to the claimed "memory device". Regarding claims 8-12,

these claims are co-extensive in scope with claims 2-6 discussed above. Regarding claim 13, it is inherent in an MPEG-2 encoder that frames are I-frames, P-frames, or B-frames, and that only I-frames or P-frames, but not B-frames can serve as references for other frames. See Watkinson, pg. 186: "B pictures are never predicted from one another, only from I or P pictures". Regarding claims 14 and 15, as an MPEG-2 encoder, Sethuraman quantizes DCT coefficient blocks (column 4: lines 40-54).

Regarding claims 16-21, the encoder of Sethuraman may be stored on a computer-readable medium (column 9: lines 37-38), and regarding claim 22, the encoder may be executed on a computer comprising a CPU and a memory (column 9: line 28).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5,912,706 A (Kikuchi et al.) teaches a video encoder and decoder that chooses between a motion estimation for a large block, a motion estimation for a small block, or an intra coding mode. US Patent 6,654,419 B1 (Sriram et al.) teaches a lossless video encoder that encodes inter-frames as residual prediction errors. US Patent Application Publication 2002/0172282 A1 (Kato) teaches a video encoder that judges whether to encode a macroblock with intra-coding or inter-coding based on a motion prediction residual calculation.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571) 272-9662. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri, can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DNW

Mehrdad Dastouri
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SUPERVISORY PATENT EXAMINER

TC 2600